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WATER SUPPLY OUTLOOK FOR WASHINGTON

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MAR 3 - 1967

and
FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS

CURRENT SERIAL RECORDS

UNITED STATES DEPARTMENT of AGRICULTURE...SOIL CONSERVATION SERVICE,

and

DEPARTMENT of CONSERVATION STATE of WASHINGTON

Data included in this report were obtained by the agencies named above in cooperation with the U.S. Forest Service, U.S. Geological Survey, National Park Service, and other Federal, State and Private organizations.

AS OF
FEB. 1, 1967

TO RECIPIENTS OF WATER SUPPLY OUTLOOK REPORTS:

Most of the usable water in western states originates as mountain snowfall. This snowfall accumulates during the winter and spring, several months before the snow melts and appears as streamflow. Since the runoff from precipitation as snow is delayed, estimates of snowmelt runoff can be made well in advance of its occurrence. Streamflow forecasts published in this report are based principally on measurement of the water equivalent of the mountain snowpack.

Forecasts become more accurate as more of the data affecting runoff are measured. All forecasts assume that climatic factors during the remainder of the snow accumulation and melt season as they affect runoff will add to be an effective average. Early season forecasts are therefore subject to a greater change than those made on later dates.

The snow course measurement is obtained by sampling snow depth and water equivalent at surveyed and marked locations in mountain areas. A total of about ten samples are taken at each location. The average of these are reported as snow depth and water equivalent. These measurements are repeated in the same location near the same dates each year.

Snow surveys are made monthly or semi-monthly from January 1 through June 1 in most states. There are about 1400 snow courses in Western United States and in the Columbia Basin in British Columbia. In the near future, it is anticipated that automatic snow water equivalent sensing devices along with radio telemetry will provide a continuous record of snow water equivalent at key locations.

Detailed data on snow course and soil moisture measurements are presented in state and local reports. Other data or reservoir storage, summaries of precipitation, current streamflow, and soil moisture conditions at valley elevations are also included. The report for Western United States presents a broad picture of water supply outlook conditions, including selected streamflow forecasts, summary of snow accumulation to date, and storage in larger reservoirs.

Snow survey and soil moisture data for the period of record are published by the Soil Conservation Service by states about every five years. Data for the current year is summarized in a West-wide basic data summary and published about October 1 of each year.

Listed below are water supply outlook reports based on Federal-State-Private Cooperative snow surveys. Those published by the Soil Conservation Service may be obtained from Soil Conservation Service, Room 507, Federal Building, 701 N. W. Glisan, Portland, Oregon 97209.

PUBLISHED BY SOIL CONSERVATION SERVICE

D. A. WILLIAMS, Administrator

The Soil Conservation Service publishes reports following the principal snow survey dates from January 1 through June 1 in cooperation with state water administrators, agricultural experiment stations and others. Copies of the reports for Western United States and all state reports may be obtained from Soil Conservation Service, Western Regional Technical Service Center, Room 507, 701 N. W. Glisan, Portland, Oregon 97209.

Copies of state and local reports may also be obtained from state offices of the Soil Conservation Service in the following states:

STATE	ADDRESS
Alaska	P. O. Box "F", Palmer, Alaska 99645
Arizona	6029 Federal Building, Phoenix, Arizona 85205
Colorado (N. Mex.)	12417 Federal Building, Denver, Colorado 80202
Idaho	P. O. Box 38, Boise, Idaho 83701
Montana	P. O. Box 855, Bozeman, Montana 59715
Nevada	P. O. Box 4850, Reno Nevada 89505
Oregon	1218 S. W. Washington St., Portland, Oregon 97205
Utah	4001 Federal Building, Salt Lake City, Utah 84111
Washington	840 Bon Marche Bldg., Spokane, Washington 99206
Wyoming	P. O. Box 340, Casper, Wyoming 82602

PUBLISHED BY OTHER AGENCIES

Water Supply Outlook reports prepared by other agencies include a report for California by the Water Supply Forecast and Snow Surveys Unit, California Department of Water Resources, P. O. Box 388, Sacramento, California 95802 --- and for British Columbia by the Department of Lands, Forests and Water Resources, Water Resources Service, Parliament Building, Victoria, British Columbia



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FEDERAL-STATE-COOPERATIVE
SNOW SURVEY AND WATER SUPPLY FORECASTS

For
WASHINGTON

Report Prepared
By

Robert T. Davis, Snow Survey Supervisor

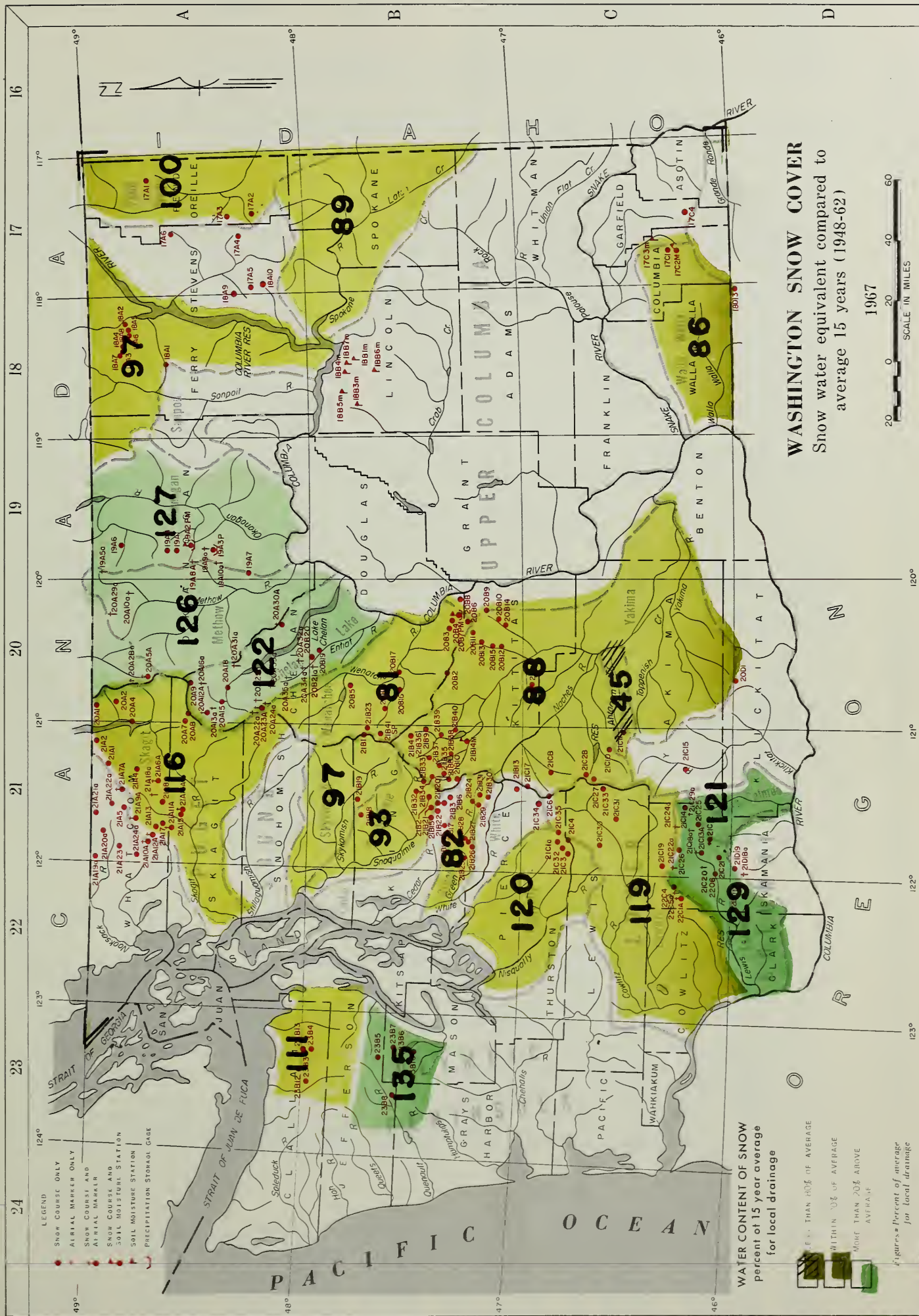
Soil Conservation Service
840 Bon Marche Building
Spokane, Washington

Issued By

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Soil Conservation Service
U. S. Department of Agriculture

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Division of Water Resources
Department of Conservation
State of Washington





INDEX to WASHINGTON SNOW COURSES, SOIL MOISTURE STATIONS and PRECIPITATION STORAGE GAGES

UPPER COLUMBIA DRAINAGE					LOWER COLUMBIA DRAINAGE					OLYMPIC PENINSULA				
NAME	NUMBER	SEC.	TWP., RANGE	ELEV.	NAME	NUMBER	SEC.	TWP., RANGE	ELEV.	NAME	NUMBER	SEC.	TWP., RANGE	ELEV.
Pend Oreille River					Squillechuck Creek					Lewis River (continued)				
Boyer Mountain	17A2	7	31N 43E	5250	Beehive Springs	20B3	12	21N 19E	4400	Divide Meadow	21C29a	21	9N 10E	5600
Bunchgrass Meadow	17A1	24	37N 44E	5000	Scout-A-Vista	20B4	18	21N 20E	3400	Grand Meadow	21C25	28	8N 9E	3500
Winchester Creek	17A3	30	33N 43E	2970						Lone Pine Shelter	21C26	8	9N 7E	3800
Kettle River					Stemilt Creek					Skagit River				
Boulder Road	18A2	36	30N 36E	1450	Jump-Off	20B8	34	21N 20E	4450	Marble Mountain	22C5a	24	8N 5E	3200
Baile Creek	18A3	28	30N 35E	4070	Stemilt Slide	20B8	30	21N 20E	5000	Freezout Creek Trail	20A1	14	40N 14E	5700
Baile Creek	18A3	28	30N 35E	4070	Upper Wheeler	20B7PM	30	21N 20E	4400	Freezout Meadows	20A2	8	40N 16E	5000
Cabin Creek	18A8	26	30N 35E	3595						Lake Hazen	21A2	19	40N 14E	2600
Cabin Creek	18A8	26	30N 35E	3595						Meadows Cabins	20A7	29	36N 14E	1900
Snow Caps Trail	18A6	5	38N 36E	2720						Thunder Basin	20A8	15	35N 14E	4200
Snow Caps Trail	18A7	20	30N 35E	4600										
Colville River					Crab Creek					Baker River				
Bald	17A6	10	36N 42E	3215	Creston-Kuna	18B1m	32	27N 34E	2440	Dock Butte	21A11a	8	36N 8E	3600
Carlson	18A9	34	32N 38E	2885	Jack Woods	18B3m	28	27N 31E	2750	Easy Pass	21A7a	19	30N 11E	5400
Chevelah	17A4	11	32N 41E	4925	Krause	18B4m	21	27N 33E	2420	Jasper Pass	21A6a	17	30N 11E	5200
Stranger Mountain	17A5	26	31N 38E	4950	Shaffels	18B5m	24	27N 32E	2378	Mount Elum	21A18a	27	38N 10E	5800
Togo	18A10	6	29N 38E	3370	Sherratt	18B7m	17	27N 33E	2410	Rocky Creek	21A12a	20	37N 8E	2100
					Whetridge	18B8m	24	25N 32E	2290	S. F. Thunder Creek	21A10a	18	37N 8E	3400
Sanpoil River					Yakimo River					Nookstock River				
Sherman Creek Pass	18A1	10	36N 35E	5350	Ahtanum R. S.	21C11	26	12N 14E	3100	Bald Mountain	21A19m	7	40N 7E	4400
					Big Boulder Creek	21B9	35	23N 14E	3200	Canyon	21A20a	20	40N 8E	5100
					Bumping Lake	21C8	23	16N 12E	3450	Glacier Creek	21A23	9-10	38N 7E	3700
					Clockum Pass	20B9	25	20N 20E	5370	Hannequin Pass	21A22a	8	39N 9E	5000
					Cooke Creek	20B10	17	19N 20E	4123	Mazama Park	21A24a	2	37N 7E	4500
					Cooper Pass	21B36	33	23N 13E	3300	Panorama	21A5	17	39N 9E	4300
					Fish Lake	21B4	34	24N 14E	3371	Twin Lakes	21A21a	16	40N 9E	5200
					Green Lake	21C10	3	12N 13E	6000					
					Grouse Camp	20B11	29	21N 19E	5385					
					High Creek	20B12	34	20N 19E	2950					
					Hyak	21B5a	15	22N 11E	2600					
					Kachess Dam	21B38	34	21N 13E	2220					
					Kachess Peninsula	21B37	32	22N 13E	2280					
					Lake Cle Elum	21B14m	15	20N 14E	2200					
					Manahatash	20C1	24	17N 16E	3935					
					Morgan Creek	21B40	9	21N 14E	2320					
					Morse Lake	21C17	6	16N 11E	5400					
					Nnum	20B13	4	20N 19E	3875					
					Noble Creek	21B35	10	21N 12E	2520					
					Salmon La Sac	21B39	16	22N 14E	2340					
					Shoquamlie Pass	21B59	4	22N 11E	3020					
					Trail Creek	20B14	20	19N 20E	3360					
					Tunnel Avenue	21B8	13	21N 11E	2450					
					Walters Flat	20B15	22	20N 19E	3360					
					White Pass (East Side)	21C28	2	13N 11E	4500					
					White Pass (Leach Lake)	21C27	1	13N 11E	4500					
Methow River					Asofin Creek					Green River				
Billy Goat Pass	20A10a	10	38N 20E	6400	Spruce Springs	17C4	9	8N 42E	5700	Airstrip	21B24	18	20N 11E	1800
Dollar Watch	20A29a	8	39N 20E	7000						Charley Creek	21B25	27	21N 8E	1200
Harts Pass	20A5A	7	37N 18E	6500						Cross Mountain No. 1	21B26	21	20N 8E	4000
Horseshoe Basin	19A5a	15	40N 23E	7000						Cross Mountain No. 2	21B27	14	20N 8E	2900
Loup Loup	19A7	36	34N 23E	4650						Cross Mountain No. 3	21B28	12	20N 8E	2100
Chelon Lake Basin					Klickitat River					Elwha River				
Cloudy Pass	20A22a	12	31N 15E	6500	Satus Pass	20D1	21	6N 17E	4030	Lester Creek	21B29	36	20N 10E	3100
Greenwood Flat	20A25a	3	31N 16E	3510	West Fork Cabin	21C15	23	9N 12E	3000	Sawmill Ridge	21B31	5	19N 11E	4700
Little Meadows	20A24a	8	31N 16E	5275						Stamper Pass	21B10	25	21N 11E	3000
Lyman Lake	20A23a	18	31N 16E	5900						Twin Camp	21B30	18	19N 11E	4100
Park Creek Flat	20A12a	7	34N 16E	2220										
Park Creek Ridge	20A12a	7	34N 16E	4600										
Petersons	20A16a	3	34N 17E	3730										
Rainy Pass	20A9	21	35N 17E	4780										
Safety Harbor	20A30a	32	31N 20E	6300										
Mar Creek Pass	20A31a	34	33N 18E	6500										
Entiat River					White Salmon River					Skokomish River				
Brief	20B19	34	28N 19E	1600	Cultus Creek	21C12	35	7N 8E	4000	City Cabin	21B3	10	21N 10E	2390
Entiat Meadows	20A35a	28	31N 17E	4800						Homehead	21B21	30	22N 10E	3300
Entiat River Trail	20A32a	22	29N 18E	4300						Mt. Gardner	21B22	31	22N 10E	2500
Pope Ridge	20B20	22	29N 17E	4270						Mt. Gardner Aux.	21B23	31	22N 9E	2500
Pope Ridge	20A32a	34	30N 18E	6400						Mt. Lindsay	21B16	31	22N 9E	2500
Snow Brushy	20A35a	21	30N 17E	3850						Mt. Washington	21B15	8	22N 9E	3000
Tommy Creek	20B21a	10	28N 18E	5300						Rex River	21B17	11	21N 9E	2400
Wenatchee River										South Fork Cedar	21B6	24	21N 10E	3000
Berne-Mill Creek	21B23	7	26N 15E	2925						Tinkham Creek	21B20	1	21N 10E	3400
Berne-Mill Creek (New)	21B41SP	13	26N 14E	3240										
Blivett Pass No. 2	20B2	35	22N 17E	4270										
Chiwaukum C. S.	20B16	4	25N 17E	1810										
Lake Wenatchee	20B5	33	27N 17E	1970										
Leavenworth R. S.	20B17	1	24N 17E	1127										
Merritt	20B18	4	26N 16E	2140										
Stevens Pass	21B1	14	26N 13E	4070										

WATER SUPPLY OUTLOOK

February 1, 1967

* The water supply outlook for irrigation and power for the Columbia *
* Basin in Washington and its tributary streams can be considered *
* very good for this time of year. Snow surveys made in the State *
* and adjacent areas near the first of February show a snowpack that *
* varies from a low of 45% to a high of 135%. The snow cover changes *
* radically with elevation. This year the snowpack above 4500 feet *
* can be considered good to excellent; below 4500 feet can be consid- *
* ered poor to nonexistent. This condition is prevalent in all trib- *
* utary streams flowing in and through Washington. The soil moisture *
* stations report the soil mantle to be wetter than both last year *
* and 1965. Reservoir storage used for irrigation generally have *
* more water in storage than normal for this time of year while those *
* reservoirs used primarily for power have less, due to the less than *
* normal fall runoff. January runoff was generally well above aver- *
* age with a few streams reporting as low as 19% below normal but *
* ranging up to 89% above. *

SNOW COVER

All of the watersheds in the Upper Columbia Basin of Washington have a snowpack that is normal to well above for this time of year. Watersheds where high elevation snow courses are predominant, such as the Chelan, Cowlitz, Nisqually and Skokomish, indicate well above normal snowpacks. Those watersheds where the February 1 snow is measured at lower elevations, such as the Klickitat and Ahtanum, have a very low snowpack. Where there seems to be a balance of high and low snow courses the comparison of snowpacks with average is near the normal mark.

RESERVOIRS

With the exception of Coeur d'Alene Lake in the Spokane River watershed and Ross Reservoir on the Skagit River power reservoirs have less than normal amounts of water in storage. With the exception of Conconully Reservoir, Salmon Lake and Rimrock Lake, irrigation reservoirs have more water in storage than normal. Comparing the reservoir water situation with last year the situation is very much improved. With the amount of space left in the reservoir pools and the expected runoff from the high elevation snowpacks all reservoirs are expected to comfortably fill during the forthcoming runoff season.

PRECIPITATION

Fall precipitation was generally close to normal with the central part of Washington having the least amount of precipitation and the

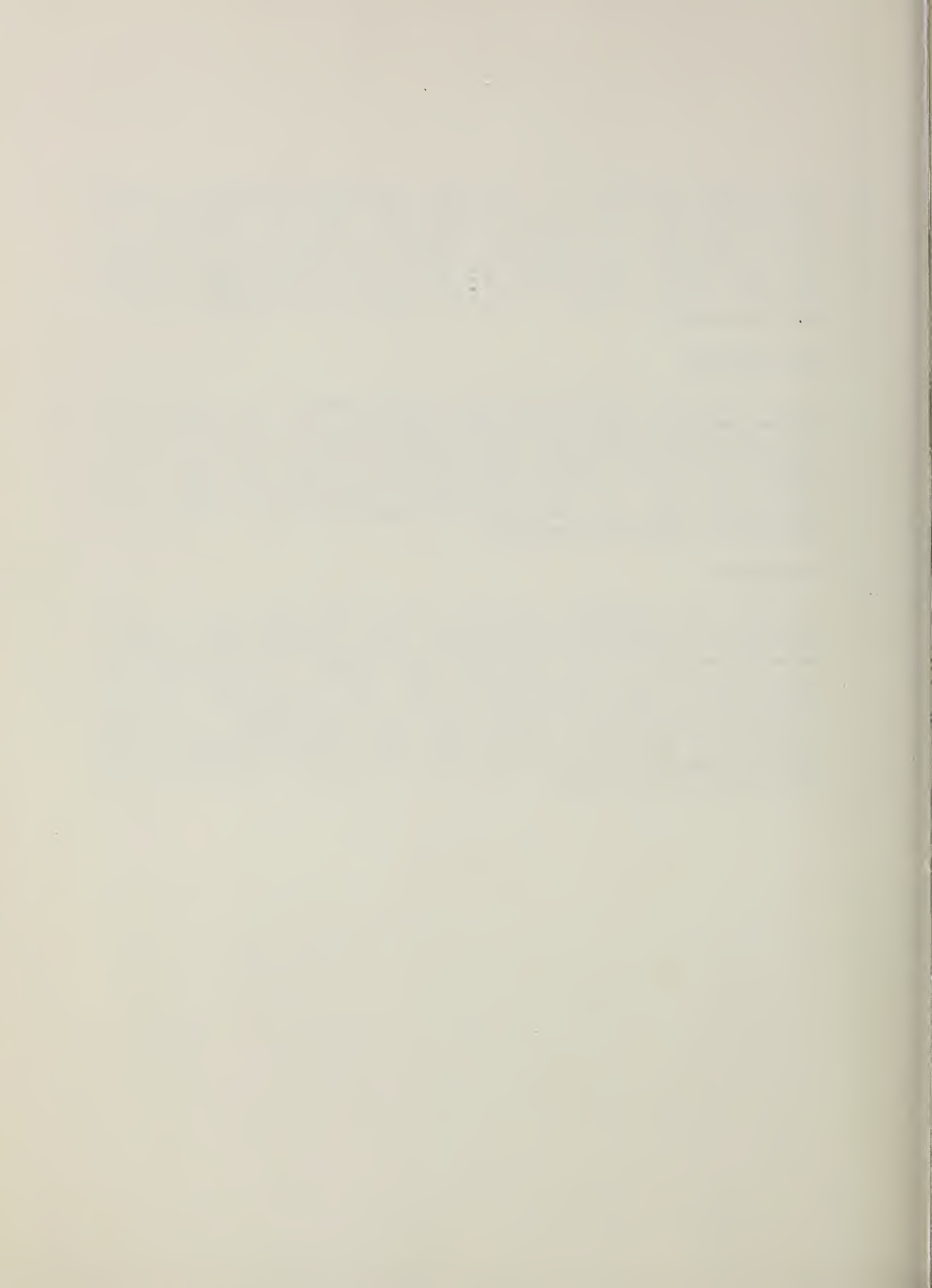
north central the most. As the winter developed December had better than normal rainfalls in the valleys again with the exception of the central portion. By January the deficit in central Washington was pretty well made up but the north central area this time was slightly less than normal. The winter picture so far for the eight divisions reported in this outlook is for above normal precipitation during the past two months.

SOIL MOISTURE

The soil mantles entered the winter period with a soil moisture condition similar to that reported the past two years. By February 1, the situation had generally improved until there is a better moisture content in the soil than was reported both last year and the year before at this time. Two new soil moisture stations were added to the network this year but these stations have insufficient records to be used for any comparison purposes.

STREAMFLOW

Forecasts of streamflows are made only for the main stem of the Columbia River as measured at The Dalles. This forecast for the April-September period is for a flow 10% above normal or 119,500,000 acre feet. April - June flow for this same station is expected to be 84,000,000 acre feet or 10% above normal, also. Numerical forecasts of other streams will be made by the Soil Conservation Service and released with the March 1 report when a more thorough analysis of the snowpack conditions and how they relate to valley precipitation and other factors can be made.



COMPARISON OF SNOW COVER WITH THAT OF PREVIOUS YEARS

The following tabulation of Washington stream basins presents the water content of the snow about February 1, 1967 as per cent of the same date in 1966 and 1965 and average of record.

Tributary Basin	No. of Courses Average	Years of Record	1967 Snow Water Expressed as per cent of		
			1966	1965	1948-1962 Avg.

UPPER COLUMBIA BASIN

Pend Oreille	5 - 8	3 - 30	111	93	100*
Kettle	3 - 13	1 - 27	94	65	97*
Colville	5	5 - 8	54	44	--
Spokane	1 - 5	3 - 22	117	85	89
Okanogan	19 - 24	1 - 29	132	124	127*
Methow	5 - 8	7 - 23	138	130	126*
Chelan	1 - 8	2 - 13	148	120	122*
Entiat	1 - 2	2 - 6	77	58	--
Wenatchee	4 - 12	6 - 22	73	57	81*
Yakima	6 - 14	8 - 45	78	65	88*
Ahtanum	1	25	36	29	45*

LOWER COLUMBIA

Mill Creek	3	13	59	62	86*
Klickitat	2	9 - 10	27	26	--
White Salmon	1	9	100	91	121*
Lewis	4 - 18	4 - 9	79	82	129*
Cowlitz	3 - 8	3 - 15	101	87	119*

PUGET SOUND

Nisqually	3 - 4	1 - 10	140	99	120*
White	1	1	94	--	--
Green	1 - 8	5 - 20	97	70	82*
Snoqualmie	1	17	85	62	93*
Skykomish	1	22	108	76	97*
Skagit	4 - 7	10 - 17	135	122	116*
Nooksack	1	10	135	129	--

OLYMPIC PENINSULA

Skokomish	1 - 5	3 - 9	113	121	135*
Elwha	1	7	130	119	--
Dungeness	1	13	109	134	111*

* Records of less than 15 years used in computation of average

RESERVOIR STORAGE - 1000 Acre Feet

BASIN or STREAM	RESERVOIR	USUABLE ^{1/} CAPACITY	1967	Measured (February) 1966	1965	Normal*
<u>COLUMBIA</u>						
Spokane	Coeur d'Alene Lake	225.1	238.0	53.8	237.5	131.0
Columbia	Franklin D. Roosevelt Lake	5232.0	3477.2	3170.0	4427.0	4059.3
Columbia	Banks Lake ^{2/}	761.8	761.8	506.1	447.6	484.3
Okanogan	Conconully Reservoir	13.0	3.2	0	4.7	7.0
Okanogan	Salmon Lake	10.5	3.2	7.8	8.4	8.9
Chelan	Lake Chelan	676.1	255.0	272.0	334.0	341.0
<u>YAKIMA</u>						
Yakima	Keechelus Lake	157.8	113.0	76.4	104.6	87.4
Kachess	Kachess Lake	239.0	186.3	162.8	191.3	171.9
Cle Elum	Lake Cle Elum	436.9	235.0	186.4	307.1	240.9
Bumping	Bumping Lake	33.7	5.9	3.2	10.8	10.4
Tieton	Rimrock Lake	198.0	91.0	82.4	153.9	113.0
<u>PUGET SOUND</u>						
Skagit	Ross Reservoir ^{2/}	1202.9	1132.2	867.9	916.5	766.9
Skagit	Diablo Reservoir	90.6	84.7	85.9	82.9	85.7
Skagit	Gorge Reservoir	9.8	8.4	7.4	7.5	--

^{1/} Based on Active Storage

^{2/} Less than 15-year record in period 1948-62

* 15-year average 1948-62

SOIL MOISTURE - FEBRUARY

Drainage Basin and Station	Number	Elev.	Profile	(Inches)	Soil Moisture Content		
			Depth	Total Capacity	: (Inches)	as of Feb. 1	
196719661965							
<u>CRAB CREEK</u>							
Creston-Kunz	18B1	2440	48	13.6	7.9	5.3	7.7
Jack Woods	18B3m	2600	48	13.6	7.9	7.0	6.7
Krause	18B4m	2440	48	13.6	8.4	6.9	7.4
Sheffels	18B5m	2360	48	13.6	7.5	5.1	5.8
Sherman	18B7m	2440	48	13.6	5.6	--	--
Wheatridge	18B6m	2200	48	13.6	7.8	5.9	6.6
<u>OKANOGAN</u>							
Salmon Meadows	19A2M	4500	48	5.4	3.6	2.1***	--
Trout Creek	3-M	3600	48	7.3	4.3*	3.4	4.0
<u>YAKIMA</u>							
Domery Flat	21B20m	2200	48	6.9	4.9	4.4*	4.9
Lake Cle Elum	21B14M	2200	48	12.8	10.0	8.9*	9.0
<u>WALLA WALLA</u>							
Couse	17C3m	3650	48	11.1	7.4	7.2	10.1
Helmers	17C2M	4400	48	12.0	10.0	6.8	11.5
<u>WENATCHEE</u>							
Upper Wheeler	20B7M	4400	48	12.7	10.3	8.0	7.2

* January 1 measurement

** March 1 measurement

FALL SOIL MOISTURE

Drainage Basin and Station	Number	Elev.	Profile (Inches)		Soil Moisture Content			
			Total	Depth	Capacity	: (Inches) as of Oct. 1		
						1966	1965	1964
<u>CRAB CREEK</u>								
Creston-Kunz	18B1m	2440	48	13.6	5.0	4.9	5.4	
Jack Woods	18B3m	2600	48	13.6	4.3	5.0	4.4	
Krause	18B4m	2440	48	13.6	5.1	5.8	5.9	
Sheffels	18B5m	2360	48	13.6	3.8	4.0	3.7	
Sherman	18B7m	2440	48	13.6	3.7	--	--	
Wheatridge	18B6m	2200	48	13.6	4.1	4.2	4.1	
<u>OKANOGAN</u>								
Salmon Meadows	19A2M	4500	48	5.4	3.0	1.9	--	
Trout Creek	3-M	3600	48	7.3	3.8	4.1	4.9	
<u>YAKIMA</u>								
Domery Flat	21B20m	2200	48	6.9	2.4	1.9	4.4	
Lake Cle Elum	21B14M	2200	48	12.8	6.4	6.9	8.5	
<u>WALLA WALLA</u>								
Couse	17C3m	3650	48	11.1	5.7	6.0	5.6	
Helmers	17C2M	4400	48	12.0	6.7	6.2	6.0	
<u>WENATCHEE</u>								
Upper Wheeler	20B7M	4400	48	12.7	5.7	6.2	5.3	

PRECIPITATION ^{1/}

Division Averages and Departures

DRAINAGE DIVISIONS	FALL		WINTER	
	Sept-Oct-Nov 1966 ^{2/}	Departure	Dec. 1966 & Jan. 1967 ^{2/}	Departure
	Average		Average	
Columbia in Canada	6.80	+ 0.53	7.70	+ 1.42
Pend Oreille - Spokane	7.75	- 1.19	10.64	+ 2.09
Northeastern Washington	5.29	- 0.02	6.42	+ 1.22
Southeastern Washington	5.33	- 0.54	6.93	+ 1.26
Central Washington	8.93	- 2.94	15.23	+ 1.87
North Central Washington	3.55	+ 0.52	3.65	+ 3.20
Southwest Slope Cascades	15.38	- 2.71	24.40	+ 5.93
Northwest Slope Cascades	20.24	- 3.80	32.20	+ 8.82

Northeastern Washington - Lower Spokane, Colville, Sanpoil and lower Kettle drainages

Southeastern Washington - Touchet, Tucannon and Palouse drainages

Central Washington - Yakima, Wenatchee and Chelan drainages

North Central Washington - Methow and Okanogan drainages

Northwest Slope Cascades - Puget Sound drainages

Southwest Slope Cascades - Lower Columbia drainages

^{1/} - Preliminary analysis by U. S. Weather Bureau from data furnished by Meteorological Services of Canada and U. S. Weather Bureau

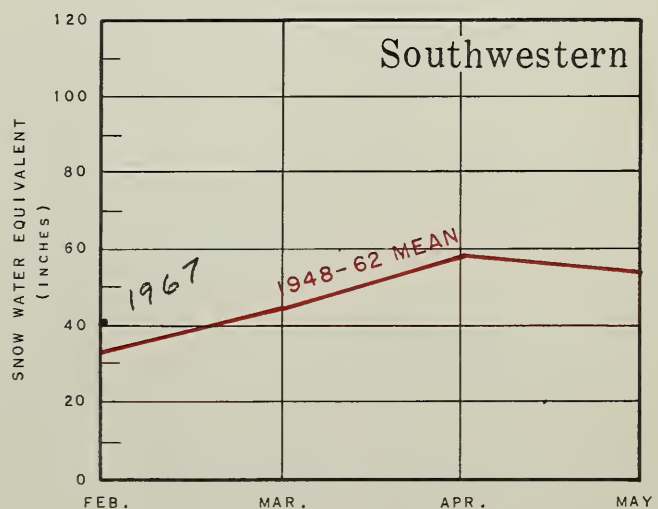
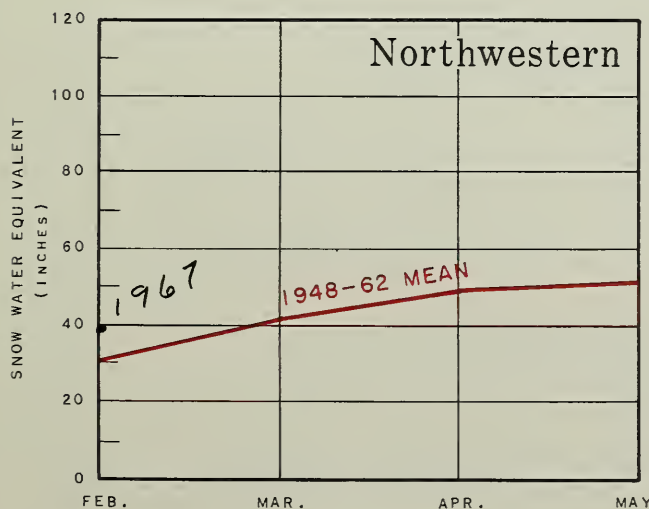
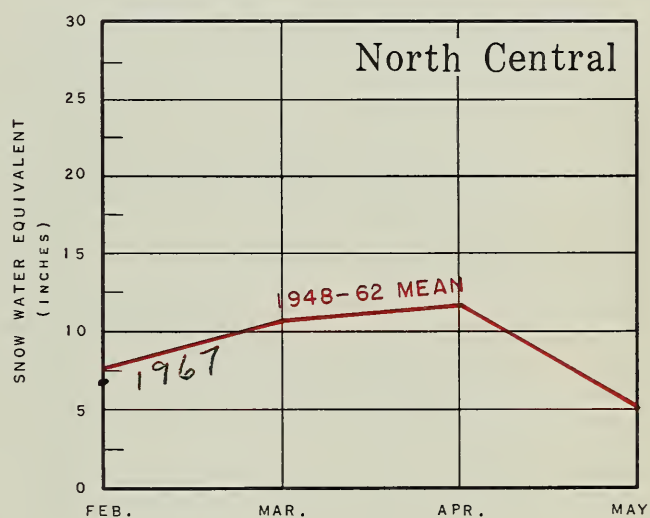
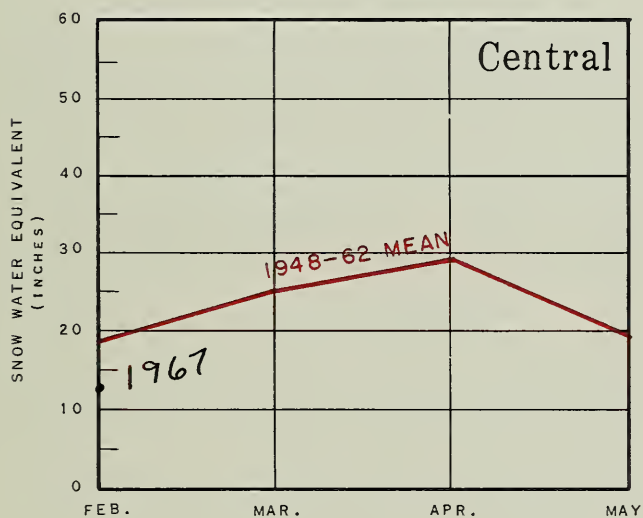
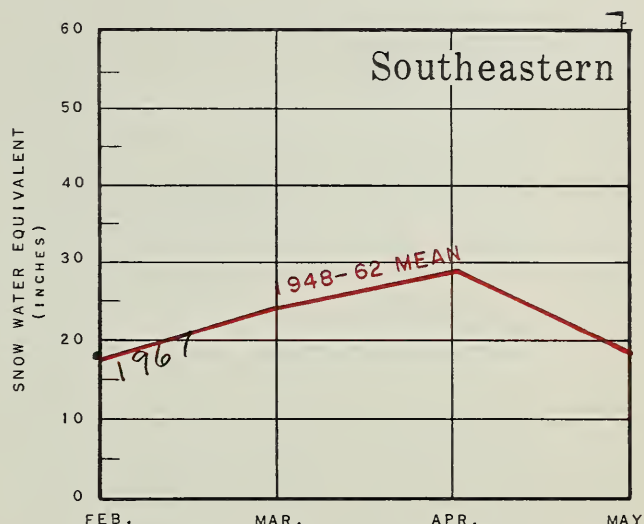
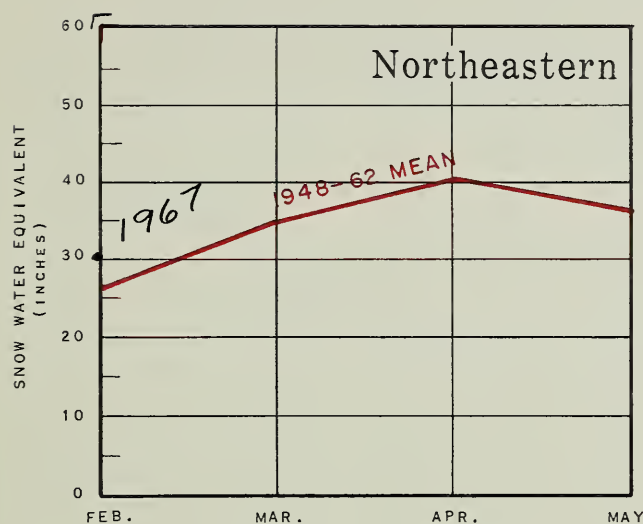
^{2/} - Departure from 15-year (1948-62) drainage division average

Note - Precipitation shown in inches

WASHINGTON SNOW COVER

1967

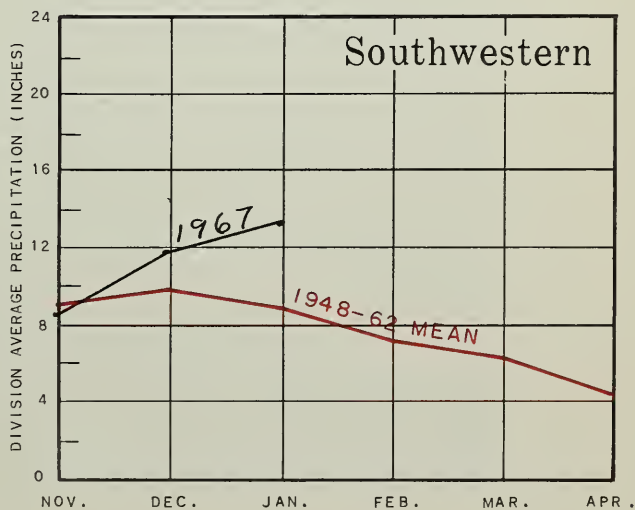
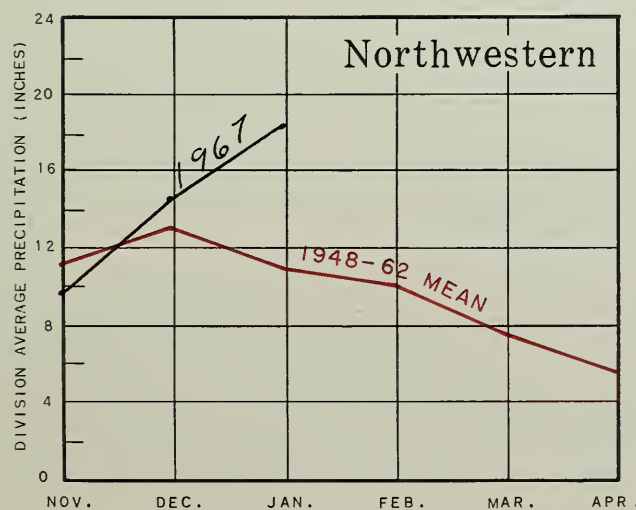
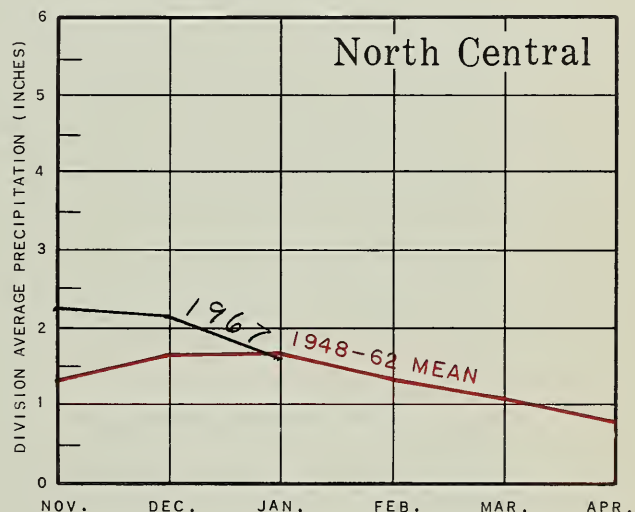
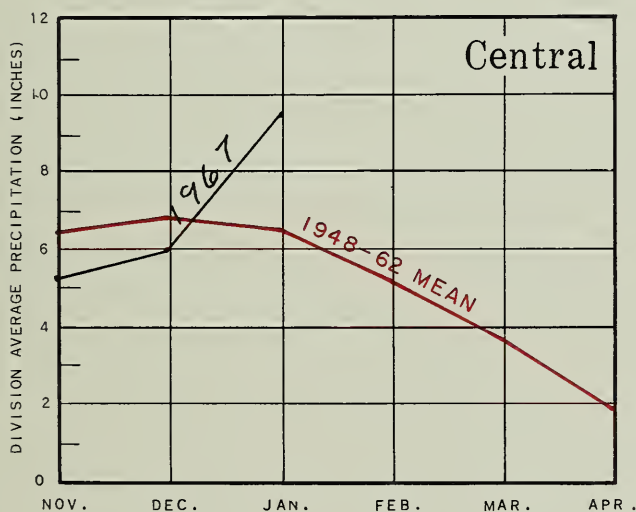
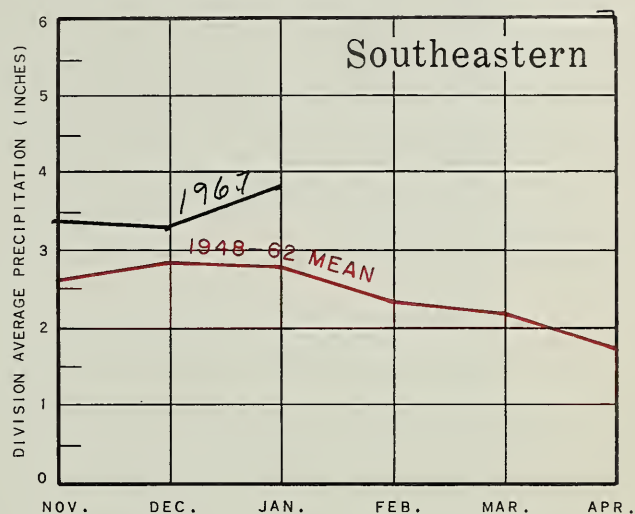
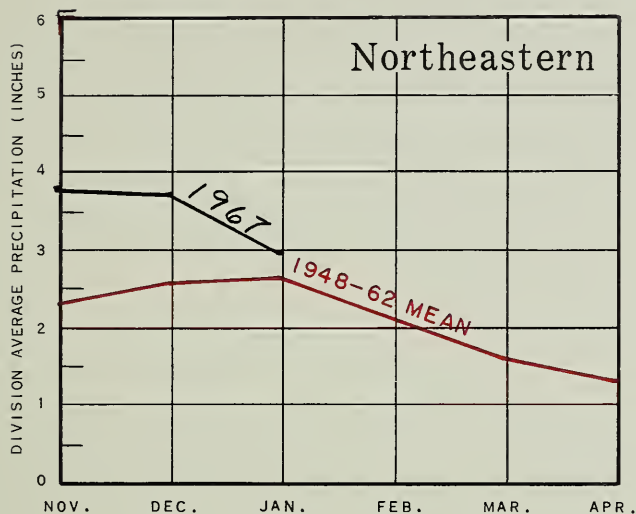
DRAINAGE AREAS



WASHINGTON VALLEY PRECIPITATION

1966 - 1967

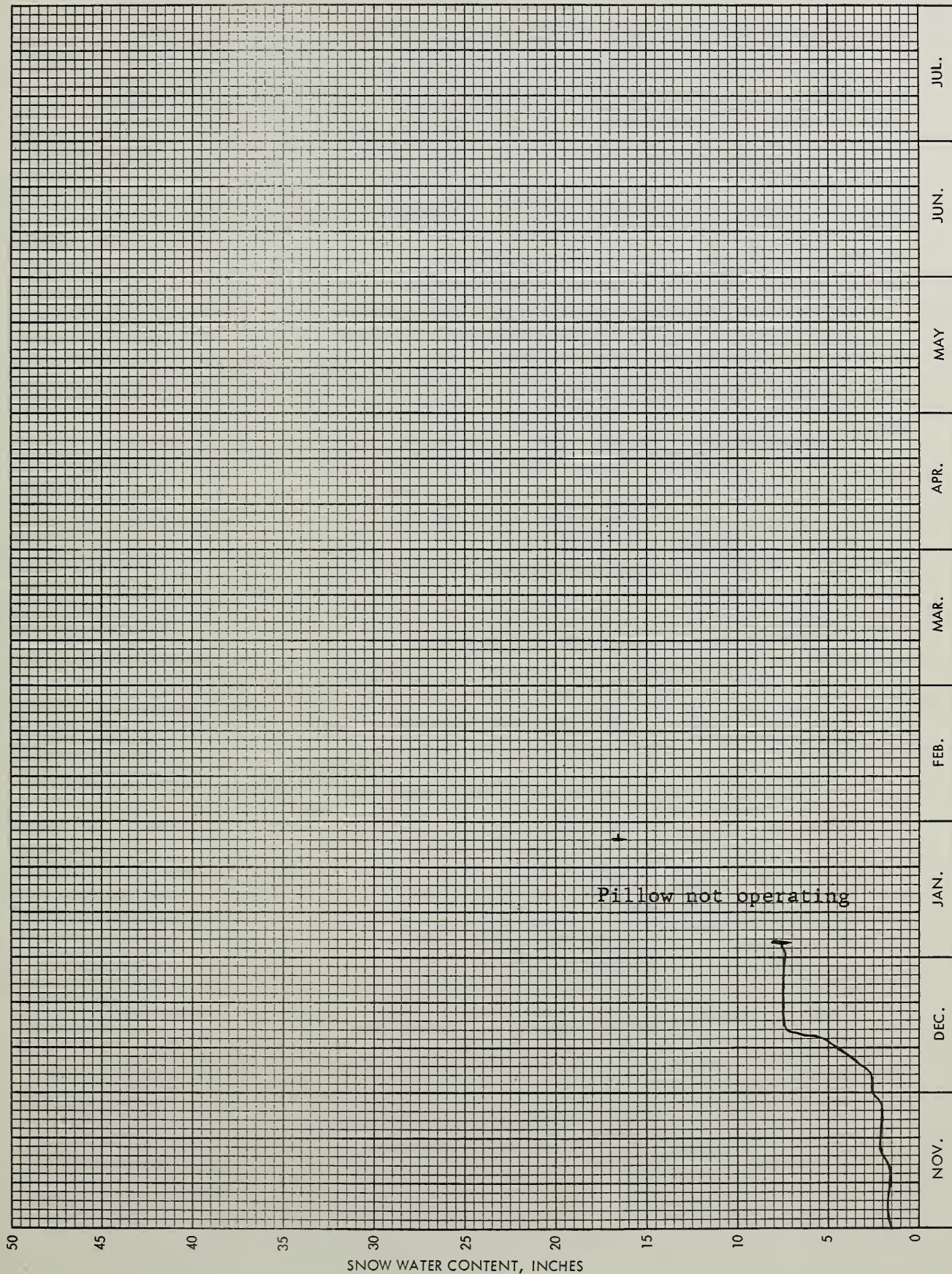
DRAINAGE AREAS



SNOW PILLOW DATA

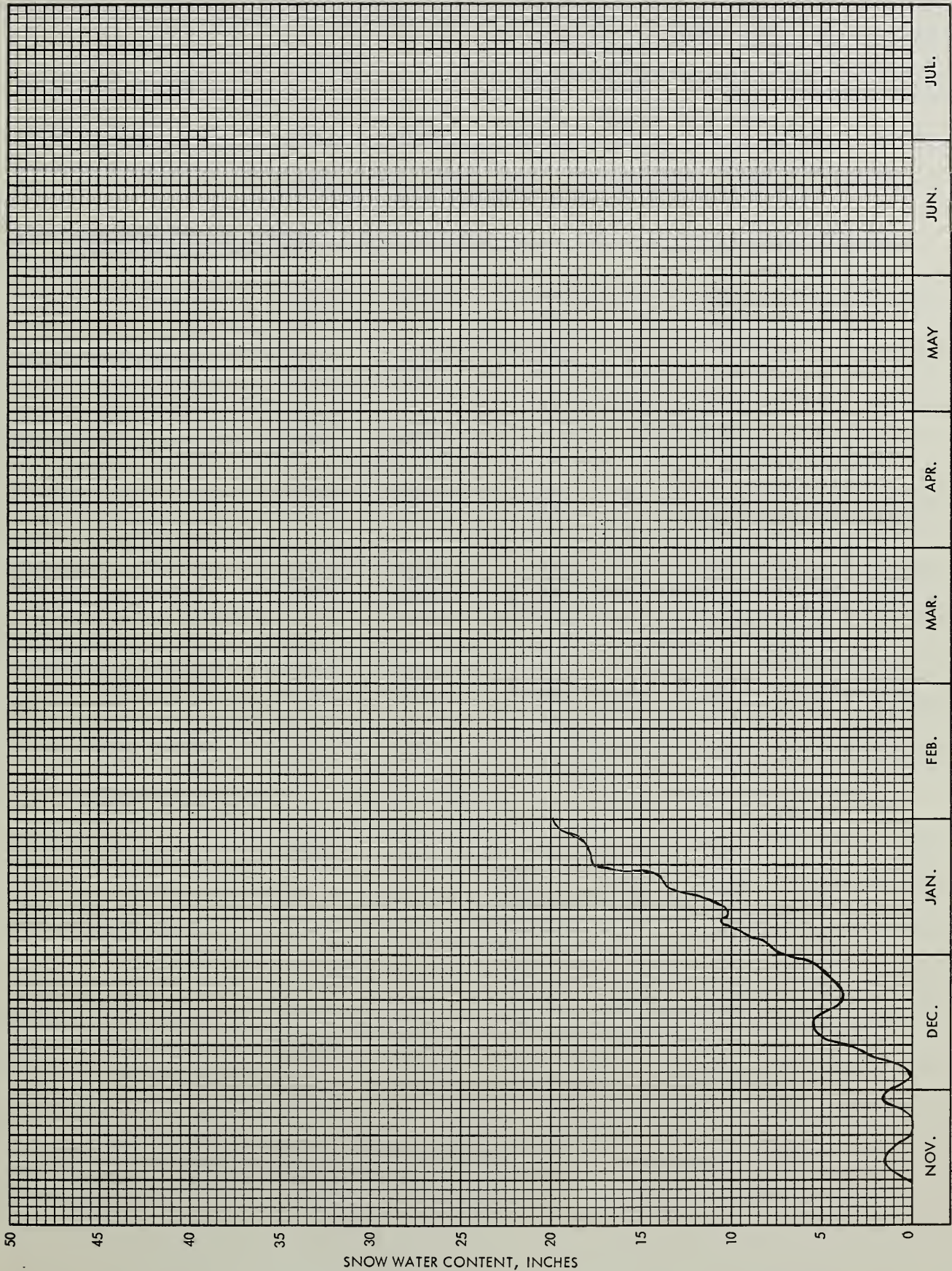
Berne-Mill Creek

Sec. 13 T. 26N R. 14E No. 21B41SP Drainage: Wenatchee
 Lat. 47° 46' Long. 121° 01' Elev. 3170



SNOW PILLOW DATA
EBA Pillow - Snoqualmie Pass

Sec. 4 T. 22N R. 11E No. 21B33SP Drainage: Yakima
Lat. 47° 25' Long. 121° 25' Elev. 3020





APPENDIX 1

SNOW DATA TO FEBRUARY 1, 1967

			SNOW COVER MEASUREMENT					
			1967	:P a s t R e c o r d				
DRAINAGE BASIN			Date	Snow	Water	:	Water	Content
and			of	Depth	Content:			(In.)
SNOW COURSE	No.	Elev.	Survey	(In.)	(In.)	:1966	1965	1948-62
Avg.								
U P P E R C O L U M B I A D R A I N A G E								
P E N D O R E I L L E R I V E R								
Benton Meadow	16A2	2344	1/5	12	2.2	5.3	6.1	3.4
			1/31	10	3.0	6.7	8.9	5.6
Benton Spring	16A3	4900	12/21	21	6.6	9.1	9.6	9.3
			1/31	50	16.9	14.1	15.7	14.7
#Chewelah	17A4	4925	1/30	38	11.5	16.9	18.5	--
Lookout	15B2	5250	12/29	56	15.6	12.5	17.6	17.6*
			1/31	94	29.2	21.6	27.7	26.4
Nelson	Canada	3050	1/30	47	13.2	13.9	13.2	12.0
Schweitzer Bowl	16A6	4500	12/30	49	15.3	9.3	14.0	--
			1/28	86	28.5	21.3	23.3	--
Schweitzer Ridge	16A5	6100	12/30	73	23.0	13.2	21.3	--
			1/28	121	39.2	29.2	38.3	--
Winchester Creek	17A3	2970	1/27	29	6.5	9.8	14.0	9.9*
K E T T L E R I V E R								
Boulder Road	18A2	1450	10/26	0	0.0	0.0	0.0	--
			11/10	0	0.0	0.0	0.0	--
			11/28	0	0.0	0.0	0.0	--
			12/12	0	0.0	0.0	0.0	--
			12/28	0	0.0	3.4	3.0	--
			1/12	7	1.6	4.4	6.9	--
			1/27	10	2.0	5.6	7.1	--
Big White Mountain	Canada	5500	1/28	58	17.9	--	--	--

Not located directly on this drainage

* Adjusted 1948-62 average

APPENDIX 2

			SNOW COVER MEASUREMENT					
			1967	:P a s t R e c o r d				
DRAINAGE BASIN			Date	Snow	Water	: Water Content (In.)		
and			of	Depth	Content:	1948-62		
SNOW COURSE	No.	Elev.	Survey	(In.)	(In.)	:1966	1965	Avg.
<u>KETTLE RIVER (Cont.)</u>								
Butte Creek	18A3	4070	10/26	0	0.0	0.0	0.0	--
			11/10	0	0.0	0.0	1.2	--
			11/28	6	1.3	0.6	1.3	--
			12/12	20	4.6	1.7	3.1	--
			12/28	17	4.4	4.0	5.5	--
			1/12	26	6.4	5.5	9.1	--
			1/27	26	6.5	7.4	9.7	--
Cabin Creek	18A8	3170	10/26	0	0.0	0.0	0.0	--
			11/10	0	0.0	0.0	0.5	--
			11/28	2	0.6	0.0	0.0	--
			12/12	14	3.0	1.0	3.1	--
			12/28	12	3.3	3.5	5.1	--
			1/12	20	4.8	5.0	8.2	--
			1/27	22	5.3	5.6	9.4	--
Carmi	Canada	4100	2/1	22	6.7	3.5	7.5	--
Farron	Canada	4000	1/31	38	11.6	10.7	13.5	10.1
Goat Creek	18A4	3595	10/26	0	0.0	0.0	0.0	--
			11/10	0	0.0	0.0	0.5	--
			11/28	0	0.0	0.0	0.6	--
			12/12	15	3.0	0.6	2.6	--
			12/28	11	2.4	3.5	4.7	--
			1/12	19	4.4	4.7	7.3	--
			1/27	21	5.0	5.5	8.2	--
Lower Trapping Creek	Canada	3050	1/30	18	5.1	3.6	--	--
Monashee Pass	Canada	4500	1/31	40	11.8	10.9	9.7	9.5**
Old Glory Mtn	Canada	7000	1/30	79	13.0	17.5	24.0	17.9**
Snow Caps Creek	18A5	2150	10/26	0	0.0	0.0	0.0	--
			11/10	0	0.0	0.0	0.0	--
			11/28	0	0.0	0.0	0.0	--
			12/12	0	0.0	0.0	1.3	--
			12/28	0	0.0	3.0	3.3	--
			1/12	7	1.5	4.3	6.8	--
			1/27	9	2.0	4.8	7.2	--

** Average for years of record

APPENDIX 3

			SNOW COVER MEASUREMENT					
			1967	:P a s t R e c o r d				
DRAINAGE BASIN			Date	Snow	Water	Water Content (In.)		
and			of	Depth	Content:	1948-62		
SNOW COURSE	No.	Elev.	Survey	(In.)	(In.)	:1966	1965	Avg.
<u>KETTLE RIVER (Cont.)</u>								
Snow Caps Trail	18A6	2720	10/26	0	0.0	0.0	0.0	--
			11/10	0	0.0	0.0	0.0	--
			11/28	0	0.0	0.0	0.0	--
			12/12	7	1.7	0.5	1.9	--
			12/28	5	1.3	3.1	4.1	--
			1/12	11	2.4	4.4	6.6	--
			1/27	15	3.5	5.2	7.2	--
Summit G. S.	18A7	4600	10/26	0	0.0	0.0	0.0	--
			11/10	0	0.0	0.0	0.8	--
			11/28	6	1.6	0.8	1.2	--
			12/12	18	3.9	2.1	3.1	--
			12/28	17	4.1	3.6	5.0	--
			1/12	24	6.1	5.4	7.8	--
			1/27	25	6.3	6.5	9.3	--
Upper Trapping Cr.	Canada	5500	1/29	33	8.0	5.6	--	--
<u>COLVILLE RIVER</u>								
Baird	17A6	3215	1/31	18	4.6	6.1	8.6	--
Carlson	18A9	2885	1/26	10	2.3	5.1	6.6	--
Chewelah	17A4	4925	1/30	38	11.5	16.9	18.5	--
Stranger Mountain	17A5	4990	1/27	25	6.6	13.0	16.0	--
Togo	18A10	3370	1/26	17	3.1	11.1	14.7	
<u>SPOKANE RIVER</u>								
Forty-nine Mdws.+	15B3A	5000	2/1	85	26.4	21.3	28.0	--
4th of July Summit	16B3	3100	12/29	10	2.0	6.6	4.7	--
			1/31	20	4.8	8.3	8.9	--
Granite Peak	15B13A	6000	2/7	114	33.1	28.3	40.9	--
#Lookout	15B2	5250	12/29	56	15.6	12.5	17.6	17.6*
			1/31	94	29.2	21.6	27.7	26.4
Lost Lake +	15B14A	6000	1/30	131	40.7	28.0	49.1	--
Medicine Ridge +	15B4A	6150	2/7	139	40.3	35.0	46.4	--
Outlaw Creek +	15B12A	3750	2/1	39	11.5	12.4	11.6	--
Sherwin.	16C1	3200	1/28	34	10.0	10.0	12.4	--

Not located directly on this drainage

* Adjusted 1948-62 average

+ Snow water equivalent estimated from aerial stadia observation

APPENDIX 4

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			1967		:P a s t R e c o r d			
			Date	Snow	Water	: Water Content (In.)		
			of	Depth	Content:	1948-62		
			Survey	(In.)	(In.)	:1966	1965	Avg.
OKANOGAN RIVER								
Aberdeen Lake	Canada	4300	1/31	21	5.0	6.3	5.7	5.0**
Blackwall Mountain	Canada	6250	1/30	81	26.6	25.2	24.8	22.7**
Brookmere	Canada	3200	1/29	32	7.6	8.0	6.3	7.3**
Clark +	19A8a	7000	1/30	63	19.5	--	--	--
Copper Mountain	Canada	4300	1/29	16	4.3	--	--	5.3**
Enderby	Canada	6250	1/27	96	34.4	20.9	19.9	--
Hamilton Hill	Canada	4900	1/28	47	13.9	13.1	--	9.4**
#Harts Pass	20A5A	6500	1/31	111	36.3	26.0	30.8	31.1*
#Horseshoe Basin +	19A5a	7000	1/30	48	14.9	--	--	--
Isintok Lake	Canada	5510	1/30	28	7.4	4.3	--	--
Lost Horse Mountain	Canada	6300	1/29	29	8.1	4.6	5.5	5.7**
#Loup Loup	19A7	4650	1/30	28	7.5	6.1	8.0	--
Lower Esperon Creek	Canada	4270	1/31	37	10.2	5.9	--	--
McCulloch	Canada	4200	1/30	23	5.8	4.6	5.2	5.0
Middle Esperon Cr.	Canada	4580	1/31	41	12.4	8.5	--	--
Missezula Mountain	Canada	5100	2/1	32	9.2	7.5	5.4	5.8**
Mission Creek	Canada	6000	1/29	55	17.7	10.5	14.3	12.0**
Monashee Pass	Canada	4500	1/31	40	11.8	10.9	9.7	9.5**
Mount Kobau	Canada	5950	1/30	40	12.0	--	--	--
Muckamuck +	19A9a	6390	1/30	50	15.5	--	--	--
Mutton Creek No. 1	19A1	5700	1/30	53	16.0	9.7	10.0	9.6*
Mutton Creek No. 2	19A4	6000	1/30	51	16.6	9.4	11.2	10.0*
New Copper Mountain	Canada	4300	1/29	18	5.1	5.6	5.9	5.4**
Paysayten +	20A28a	4300	1/30	54	17.8	--	15.6	--
Postill Lake	Canada	4500	1/30	26	7.0	5.8	5.7	5.7**
Rusty Creek	19A3	4000	1/31	23	5.6	6.7	5.8	6.0
Salmon Meadows	19A2	4500	1/30	40	6.4	6.0	9.0	7.7*
Silver Star Mtn.	Canada	6050	1/30	76	25.7	16.6	17.7	14.9**
Starvation Mtn. +	19A10a	6750	1/30	63	19.5	--	--	--
Summerland Reservoir	Canada	4200	1/28	33	8.8	6.5	--	--
Touts Coulee	19A6	2845	1/30	8	2.3	3.1	4.2	--
Trout Creek	Canada	4700	2/2	26	5.6	5.5	5.7	5.7
Upper Esperon Cr.	Canada	5290	Not Measured			10.2	--	--
#Quartette Lake	Canada	4000	1/30	33	8.1	--	--	--

Not located directly on this drainage

* Adjusted 1948-62 average

** Average for years of record

+ Snow water equivalent estimated from aerial stadia observation

APPENDIX 5

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			Date of Survey	1967 Snow Depth (In.)	Water Content: (In.)	Past Record		
						Water Content (In.)	1948-62 1965	Avg.

METHOW RIVER

Billy Goat Pass +	20A10a	6409	1/30	114	37.6	--	23.4	--
Dollar Watch +	20A29a	7000	1/30	78	25.7	--	18.7	--
Harts Pass	20A5A	6500	1/31	111	36.3	26.0	30.8	31.1*
Horseshoe Basin +	19A5a	7000	1/30	48	14.9	--	--	--
Loup Loup	19A7	4650	1/30	28	7.5	6.1	8.0	--
#Mutton Creek No. 1	19A1	5700	1/30	53	16.0	9.7	10.0	9.6*
#Mutton Creek No. 2	19A4	6000	1/30	51	16.6	9.4	11.2	10.0*
#Rusty Creek	19A3	4000	1/31	23	5.6	6.7	5.8	6.0
#Salmon Meadows	19A2	4500	1/30	40	6.4	6.0	9.0	7.7*
War Creek Pass +	20A31a	6500	Not Measured					

CHELAN LAKE BASIN

Cloudy Pass +	20A22a	6500	1/24	104	26.0	--	--	--
			1/30	114	36.5	--	29.0	29.7*
Greenwood Flat +	20A25a	3540	Not Measured			--	20.0	23.6*
Little Meadows +	20A24a	5275	1/30	120	38.4	--	30.7	31.6*
Lyman Lake	20A23A	5900	1/24	147	36.8	--	--	--
			1/30	158	50.6	--	37.7	--
Park Creek Flat +	20A13a	2220	1/24	82	20.5	--	--	--
			1/30	86	27.5	--	27.8	--
Park Creek Ridge	20A12A	4600	1/24	134	33.5	--	--	--
			1/30	146	46.7	--	33.9	--
Petersons +	20A16a	3730	1/30	102	32.6	--	28.4	--
Rainy Pass	20A9	4780	1/31	111	36.0	24.3	28.9	29.8*
Safety Harbor	20A30A	6300	1/30	83	20.8	--	24.1	--

ENTIAT RIVER

Brief	20B19	1600	1/28	15	5.0	6.8	8.6	--
Entiat Meadows +	20A33a	4800	1/30	116	26.4	--	--	--
Entiat River Trail+	20A34a	3150	1/30	60	13.7	--	--	--
Fox Camp +	20A36a	6510	1/30	137	31.2	New Aerial Marker		
Pope Ridge	20B20	4300	1/26	50	11.4	14.4	--	--
Pugh Ridge +	20A32a	6400	1/30	73	16.6	--	--	--
Snow Brushy +	20A35a	3850	1/30	83	18.9	--	--	--
Tommy Creek +	20B21a	5300	1/30	70	16.0	--	--	--

Not directly on this drainage

* Adjusted 1948-62 average

+ Snow water equivalent estimated from aerial stadia observation



APPENDIX 6

DRAINAGE BASIN and SNOW COURSE			SNOW COVER MEASUREMENT					
			1967		: P a s t R e c o r d			
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content (In.)	1948-62 Avg.	
No.	Elev.					1966	1965	
<u>WENATCHEE RIVER</u>								
Berne-Mill Cr.	21B23	2925	11/15	8	1.8	0.0	1.0	--
			11/28	14	2.5	1.4	4.8	--
			12/15	32	7.7	2.0	9.8	--
			12/29	26	7.8	5.0	14.8	--
			1/16	42	13.0	15.1	19.7	--
			1/30	55	18.8	17.8	24.7	--
Berne-Mill Cr. New	21B41SP	3240	11/15	8	2.3	--	--	--
			11/28	13	2.0	--	--	--
			11/29	21	6.8	--	--	--
			1/30	50	17.2	--	--	--
Blewett Pass No. 2	20B2	4270	12/31	6	1.9	7.6	9.6	8.1*
			1/29	25	8.2	12.7	18.0	12.4*
Chiwaukum G. S.	20B16	1810	11/15	4	0.8	0.0	0.6	--
			11/28	0	0.0	0.2	1.6	--
			12/15	10	2.0	0.4	3.7	--
			12/29	6	1.6	2.3	7.8	--
			1/16	14	3.8	7.8	10.9	--
			1/30	21	6.4	8.4	14.4	--
Lake Wenatchee	20B5	1970	11/15	4	1.0	0.0	0.0	--
			11/28	0	0.0	0.6	1.3	--
			12/15	13	2.1	1.1	4.6	--
			12/29	8	2.1	3.1	8.5	--
			1/16	20	5.7	9.9	12.4	--
			1/30	32	9.3	10.6	15.4	--
Leavenworth R. S.	20B17	1127	10/31	0	0.0	0.0	0.0	--
			11/15	1	0.3	0.0	0.0	--
			11/25	0	0.0	0.5	0.0	--
			12/12	9	1.1	0.0	0.5	--
			12/30	0	0.0	3.0	4.2	--
			1/11	0	0.0	7.3	6.1	--
			1/27	10	2.0	7.3	8.1	--
#Lyman Lake +	20A23A	5900	1/24	147	36.8	--	--	--
			1/30	158	50.6	--	37.7	--

Not directly on this drainage

* Adjusted 1948-62 average

+ Snow water equivalent estimated from aerial stadia observation

APPENDIX 7

DRAINAGE BASIN and SNOW COURSE			SNOW COVER MEASUREMENT					
			1967		: P a s t R e c o r d			
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content (In.) : 1966	1965	1948-62 Avg.
<u>WENATCHEE RIVER (Cont.)</u>								
Merritt	20B18	2140	11/15	4	0.5	0.0	0.0	--
			11/28	5	0.5	0.5	2.2	--
			12/15	18	3.3	2.0	6.3	--
			12/29	11	3.5	4.2	11.5	--
			1/16	16	4.9	12.0	16.8	--
			1/30	30	9.2	13.4	18.6	--
Stevens Pass	21B1	4070	11/15	16	3.4	0.0	1.8	--
			11/28	28	5.2	4.4	6.9	11.6*
			12/15	52	13.9	7.8	15.6	15.2*
			12/29	48	15.2	13.2	34.1	21.8*
			1/16	90	24.4	28.5	34.6	27.5*
			1/30	106	33.7	31.2	44.6	34.9
<u>SQUILCHUCK CREEK</u>								
Beehive Springs	20B3	4400	1/30	7	2.9	7.7	7.1	5.5*
Scout-A-Vista	20B4	3400	1/31	7	3.0	7.0	7.8	6.1*
<u>STEMILT CREEK</u>								
Jump-Off	20B8	4450	1/30	6	2.4	8.0	7.4	--
Stemilt Slide	20B6	5000	1/30	25	7.7	12.0	11.7	--
Upper Wheeler	20B7	4400	1/30	6	2.6	9.0	9.9	--
<u>YAKIMA RIVER</u>								
#Ahtanum R. S.	21C11	3100	12/27	8	1.8	3.3	5.8	4.3*
			1/27	12	2.9	8.1	10.1	6.5*
Blewett Pass No. 2	20B2	4270	12/31	6	1.9	7.6	9.6	8.1*
			1/29	25	8.2	12.7	18.0	12.4*
#Cayuse Pass	21C6	5300	1/7	120	38.2	25.6	--	--
			1/30	196	67.1	53.3	63.9	60.3*
Clockum Pass	20B9	5370	2/1	34	9.7	--	--	--
Cooke Creek	20B10	4123	2/1	6	1.8	7.3	--	--
Grouse Camp	20B11	5385	1/31	37	10.2	12.6	--	--
High Creek	20B12	2930	1/31	0	0.0	6.9	6.6	--

Not directly on this drainage

* Adjusted 1948-62 average

APPENDIX 8

DRAINAGE BASIN and SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENT					
			Date of Survey	1967 Snow Depth (In.)	Water Content: (In.)	: P a s t R e c o r d		
						: Water Content (In.) 1948-62		
						:1966	1965	Avg.
<u>YAKIMA RIVER (Cont.)</u>								
Lake Cle Elum	21B14M	2200	12/9	10	1.1	--	--	--
			12/19	0	0.0	--	2.0	--
			12/29	0	0.0	2.0	8.0	4.9
			1/21	13	2.5	7.8	9.7	--
			1/30	10	3.0	8.4	12.2	8.9
Manashtash	20C1	3935	1/27	14	2.8	4.5	4.9	--
Morse Lake	21C17	5400	1/30	146	51.1	32.4	45.4	39.8*
Nanum	20B13	3875	1/31	10	3.1	10.3	--	--
#Olallie Meadows	21B2	3625	1/27	72	28.1	33.0	45.3	30.1*
#Satus Pass	20D1	4030	1/31	13	4.3	17.1	14.6	--
Snoqualmie Pass	21B10SP	3020	11/29	8	2.0	--	--	--
			12/15	20	7.2	--	--	--
			12/30	25	8.4	--	--	--
			11/15	7	1.8	0.0	1.1	--
			11/22	10	4.4	--	--	--
#Stampede Pass	21B10	3000	12/2	14	5.2	2.2	5.2	--
			12/13	36	8.5	3.4	12.1	--
			12/20	24	7.5	--	--	--
			1/3	50	14.5	12.1	19.1	20.7*
			1/10	65	15.8	--	--	--
			1/17	70	19.1	16.7	23.7	25.1*
			1/20	92	26.1	--	--	--
			1/31	82	27.6	18.0	37.7	33.6*
Trail Creek	20B14	3360	2/1	0	0.0	5.4	--	--
Tunnel Avenue	21B8	2450	12/12	19	2.8	--	--	--
			12/20	7	2.0	--	7.5	--
			12/29	11	3.4	5.1	14.5	10.0
			1/10	18	5.3	--	--	--
			1/20	43	9.1	16.4	20.5	--
			1/30	36	10.7	17.3	24.8	18.7
Walters Flat	20B15	3360	1/31	5	1.8	8.1	8.5	--

Not directly on this drainage

* Adjusted 1948-62 average

APPENDIX 9

DRAINAGE BASIN and SNOW COURSE			SNOW COVER MEASUREMENT					
			1967		: P a s t R e c o r d			
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content :1966	1948-62 1965	(In.) Avg.
<u>YAKIMA RIVER (Cont.)</u>								
White Pass (E Side)	21C28	4500	1/5	39	7.9	--	18.1	--
			1/17	37	11.7	13.4	18.7	--
			1/31	49	15.6	16.1	24.3	18.5*
White Pass (Leech L)	21C27	4500	1/7	45	12.6	11.8	18.8	--
			1/17	49	14.1	--	--	--
			1/30	58	21.4	21.6	29.2	--
<u>AHTANUM CREEK</u>								
Ahtanum R. S.	21C11	3100	12/27	8	1.8	3.3	5.8	4.3*
			1/27	12	2.9	8.1	10.1	6.5*
<u>ASOTIN CREEK</u>								
Spruce Springs	17C4	5700	1/26	48	14.8	15.7	24.6	--
<u>MILL CREEK</u>								
Homestead	17C1	4030	1/27	21	5.8	9.4	8.9	7.0*
Martin Springs	17C2	4400	1/27	31	9.1	12.0	13.2	8.3*
Walla Walla Diversion	18C13	2400	12/26	0	0.0	0.0	1.0	0.0*
			1/26	0	0.0	4.0	2.0	2.0*
<u>KLICKITAT RIVER</u>								
Satus Pass	20D1	4030	1/31	13	4.3	17.1	14.6	--
West Fork Cabin	21C15	3000	1/31	12	4.2	14.7	18.1	--
<u>WHITE SALMON RIVER</u>								
Cultus Creek	21C12	4000	12/29	52	18.1	--	20.1	17.1*
			2/2	95	36.3	36.2	39.9	30.1*
#Surprise Lakes	21C13A	4250	12/29	54	18.2	23.8	22.7	21.0*
			2/2	106	37.7	37.8	43.0	32.8*

Not located directly on this drainage

* Adjusted 1948-62 average

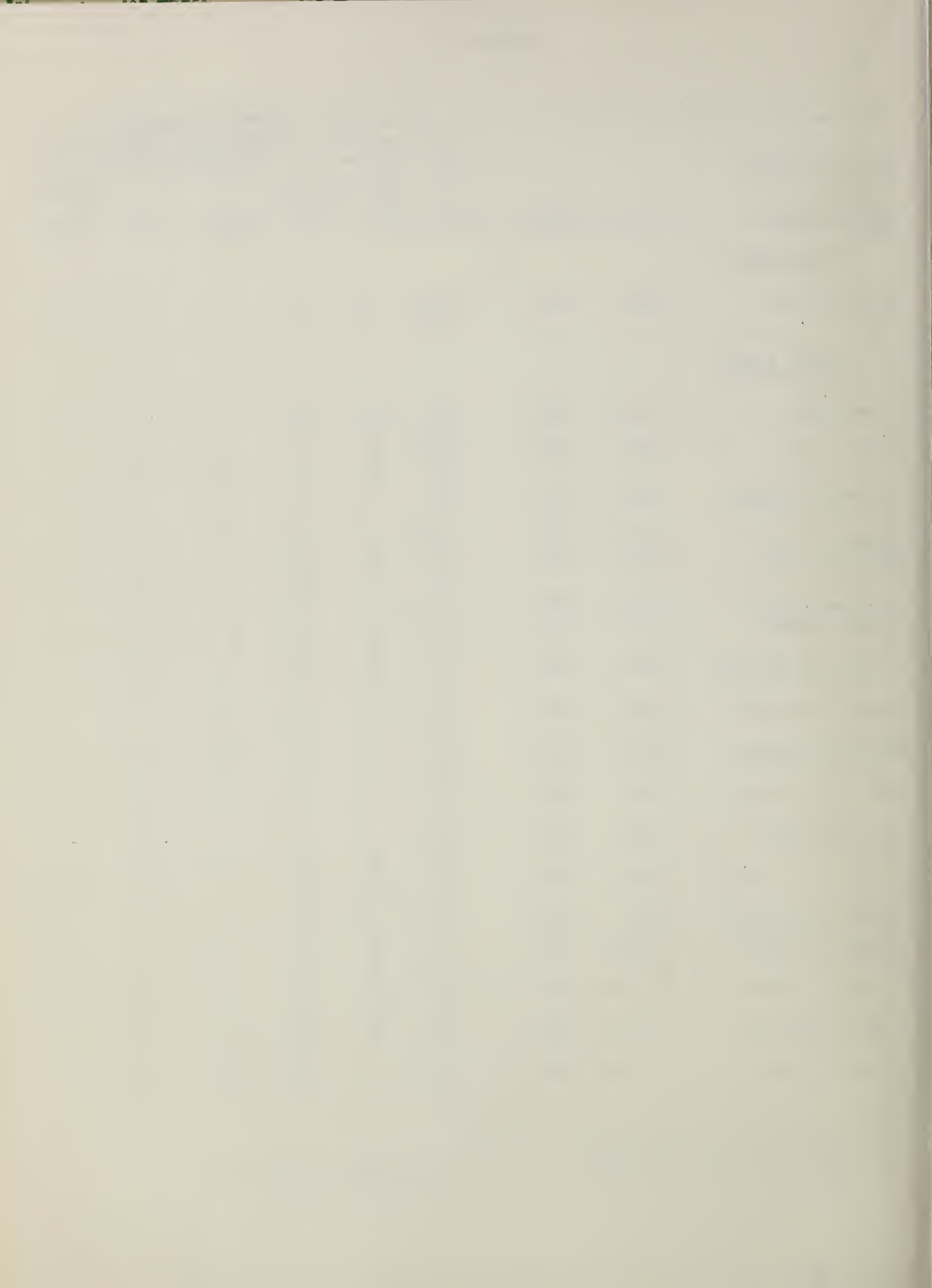
APPENDIX 10

			SNOW COVER MEASUREMENT					
			1967		: P a s t R e c o r d			
DRAINAGE BASIN and SNOW COURSE	No.	Elev.	Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content : 1966	1965	(In.) 1948-62 Avg.
<u>WIND RIVER</u>								
Old Man Pass	21D19	3100	12/30	19	1.9	--	--	--
			1/31	29	10.9	27.8	25.4	--
<u>LEWIS RIVER</u>								
Blue Lake +	21C22a	4800	1/1	104	36.4	41.0	--	--
			1/30	168	64.0	57.3	62.8	--
Bob's Trail	21C21	2200	12/29	16	2.4	16.6	9.9	--
			2/1	35	12.3	20.6	18.8	--
Calamity Ridge +	22D1a	2500	1/1	0	0.0	7.8	--	--
			1/31	0	0.0	12.4	4.8	--
Council Pass +	21C18a	4200	1/30	77	29.3	33.3	34.0	--
#Cultus Creek	21C12	4000	12/29	52	18.1	--	20.1	17.1*
			2/2	95	36.3	36.2	39.9	30.1*
Divide Meadow +	21C29a	5600	1/30	112	42.6	36.3	48.4	--
Grand Meadow	21C25	3500	12/28	22	2.2	15.1	14.2	--
			2/1	52	17.0	22.3	26.6	--
Lone Pine Shelter	21C26	3800	1/6	60	17.0	--	--	--
			1/31	88	33.2	36.4	38.0	--
Marble Mountain +	22C5a	3200	1/1	23	3.3	16.7	--	--
			1/30	42	16.8	30.3	21.6	--
#Mosquito Meadows	21C19	4100	1/6	63	17.1	28.7	--	--
			1/31	89	34.9	36.9	41.3	--
New Muddy River	22C6	1400	1/6	13	1.9	7.2	13.5	--
			1/31	6	2.4	20.0	19.2	--
Old Man Pass	21D19	3100	12/30	19	1.9	--	--	--
			1/31	29	10.9	27.8	25.4	--
Plains of Abraham +	22C1a	4400	1/1	86	30.1	--	--	23.2*
			1/30	138	52.5	--	44.4	39.4*
Smith Creek Road	22C4	2100	1/31	33	15.1	25.7	30.1	--
Spencer Meadow +	21C20a	3400	1/1	31	4.9	19.2	--	9.4*
			1/30	46	17.5	29.6	18.4	9.4*
Surprise Lakes	21C13A	4250	12/29	54	18.2	23.8	22.7	21.0*
			2/2	106	37.7	37.8	43.0	32.8*
Table Mountain +	21C24a	4200	1/1	55	18.5	25.5	--	--
			1/30	91	34.6	36.8	40.4	--
Timbered Peak +	21D18a	3000	1/1	14	1.5	14.3	--	--
			1/31	26	10.0	24.6	12.0	--

Not located directly on this drainage

* Adjusted 1948-62 average

+ Snow water equivalent estimated from aerial stadia observation



			SNOW COVER MEASUREMENT					
			1967		: P a s t R e c o r d			
DRAINAGE BASIN and SNOW COURSE	No.	Elev.	Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content (In.)	1948-62 Avg.	
<u>COWLITZ RIVER</u>								
Cayuse Pass	21C6	5300	1/7	120	38.2	25.6	--	--
			1/30	196	67.1	53.3	63.9	60.3*
Mosquito Meadows	21C19	4100	1/6	63	17.1	28.7	--	--
			1/31	89	34.9	36.9	41.3	--
Ohanapecosh	21C32	2200	1/4	10	3.3	--	--	--
			1/27	36	10.8	16.0	20.8	--
Packwood Lake	21C31	2870	1/5	16	3.3	9.5	--	--
			1/26	31	8.0	13.6	14.8	--
Pigtail Peak	21C33	5900	1/7	95	28.4	26.7	37.0	--
			1/30	135	46.3	40.2	59.0	--
Plains of Abraham +	22C1a	4400	1/1	86	30.1	--	--	23.2*
			1/30	138	52.5	--	44.4	39.4*
Potato Hill	21C14	4500	1/6	48	10.5	--	--	--
			1/31	63	22.2	26.1	29.9	19.7*
#White Pass (E Side)	21C28	4500	1/5	39	7.9	--	18.1	--
			1/17	37	11.7	13.4	18.7	--
			1/31	49	15.6	16.1	24.3	18.5*
#White Pass (Leech L)	21C27	4500	1/7	45	12.6	11.8	18.8	--
			1/17	49	14.1	--	--	--
			1/30	58	21.4	21.6	29.2	--
Willame Creek	21C30	3250	1/5	41	9.6	--	--	--
			1/31	60	22.7	24.6	28.5	--

PUGET SOUND DRAINAGENISQUALLY RIVER

Ghost Forest	21C4	4550	12/27	33	10.2	12.1	--	--
			1/30	106	37.5	31.3	37.3	30.6*
Longmire	21C3	2760	12/27	2	0.2	2.0	--	--
			1/30	25	8.6	8.8	13.8	9.5*
New Paradise Park	21C35	5500	12/27	58	20.5	18.4	--	--
			1/30	158	59.8	39.2	--	--
Stem Glade	21C1	5050	12/27	70	24.3	17.4	--	--
			1/30	170	60.4	39.8	56.2	48.4*

Not located directly on this drainage

* Adjusted 1948-62 average

+ Snow water equivalent estimated from aerial stadia observation

APPENDIX 12

DRAINAGE BASIN and SNOW COURSE			SNOW COVER MEASUREMENT					
			1967		:P a s t		R e c o r d	
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	Water Content: (In.)	Water Content (In.)	1948-62 Avg.
No.	Elev.					:1966	1965	
<u>WHITE RIVER</u>								
#Cayuse Pass	21C6	5300	1/7	120	38.2	25.6	--	--
			1/30	196	67.1	53.3	63.9	60.3*
White River Campground	21C34	4000	12/27	23	7.3	10.3	--	--
			2/2	63	20.6	21.8	--	--
<u>GREEN RIVER</u>								
Airstrip	21B24	1800	12/2	0	0.0	0.0	0.0	--
			12/27	0	0.0	2.2	4.9	--
			1/30	5	1.2	7.2	7.2	--
Charley Creek	21B25	1200	12/2	0	0.0	0.0	0.0	--
			12/27	0	0.0	3.1	4.1	--
			1/30	0	0.0	4.3	0.0	--
Grass Mtn. No. 1	21B26	4000	12/2	0	0.0	2.4	4.3	--
			12/27	6	0.7	7.1	12.2	--
			2/2	36	12.5	17.0	17.0	--
Grass Mtn. No. 2	21B27	2900	12/2	0	0.0	1.3	4.4	--
			12/27	8	1.7	--	11.6	--
			1/30	Not Measured		17.8	18.5	--
Grass Mtn. No. 3	21B28	2100	12/2	0	0.0	0.0	0.0	--
			12/27	0	0.0	--	4.1	--
			1/30	0	0.0	6.2	3.7	--
Lester Creek	21B29	3100	12/2	0	0.0	1.6	3.8	--
			12/27	13	3.2	7.1	13.1	--
			1/30	45	13.5	15.6	19.8	--
Sawmill Ridge	21B29	4700	12/2	16	4.3	2.7	6.4	--
			12/27	28	8.6	7.9	--	--
			1/30	84	27.9	20.3	32.6	--
Twin Camp	21B30	4100	12/2	5	2.0	1.8	4.2	--
			12/27	14	4.3	6.2	13.3	--
			1/30	48	17.6	14.8	26.0	--
Stampede Pass	21B10	3000	11/15	7	1.8	0.0	1.1	--
			11/22	10	4.4	--	--	--
			12/2	14	5.2	2.2	5.2	--
			12/13	36	8.5	3.4	12.1	--
			12/20	24	7.5	--	--	--
			1/3	50	14.5	12.1	19.1	20.7*
			1/10	65	15.8	--	--	--
			1/17	70	19.1	16.7	23.7	25.1*
			1/20	92	26.1	--	--	--
			1/31	82	27.6	18.0	37.7	33.6*

Not directly on this drainage

* Adjusted 1948-62 average



APPENDIX 13

DRAINAGE BASIN and SNOW COURSE			SNOW COVER MEASUREMENT					
			1967		:P a s t R e c o r d			
			Date of Survey	Snow Depth (In.)	Water Content: (In.)	:1966	1965	1948-62 Avg.
<u>SNOQUALMIE RIVER</u>								
Olallie Meadows	21B2	3625	1/27	72	28.1	33.0	45.3	30.1*
<u>SKYKOMISH RIVER</u>								
#Stevens Pass	21B1	4070	11/15	16	3.4	0.0	1.8	--
			11/28	28	5.2	4.4	6.9	11.6*
			12/15	52	13.9	7.8	15.6	15.2*
			12/29	48	15.2	13.2	34.1	21.8*
			1/16	90	24.4	28.5	34.6	27.5*
			1/30	106	33.7	31.2	44.6	34.9
<u>SKAGIT RIVER</u>								
#Cloudy Pass +	20A22A	6500	1/24	104	26.0	--	--	--
			1/30	114	36.5	--	29.0	29.7*
Devils Park	20A4	5900	1/31	116	38.6	26.5	29.7	31.9*
#Harts Pass	20A5A	6500	1/31	111	36.3	26.0	30.8	31.1*
Klesilkwa	Canada	3700	1/31	30	9.3	--	8.6	10.7*
#Lyman Lake +	20A23A	5900	1/24	147	36.8	--	--	--
			1/30	158	50.6	--	37.7	--
New Tashme	Canada	2500	1/31	20	7.0	10.7	10.2	7.8
#Rainy Pass	20A9	4780	1/31	111	36.0	24.3	28.9	29.8*
#Quartette Lake	Canada	4000	1/30	33	8.1	--	--	--
<u>BAKER RIVER</u>								
Dock Butte +	21A11A	3800	1/30	123	47.0	45.8	40.3	--
Easy Pass +	21A7A	5200	1/30	177	64.2	52.2	48.0	--
Jasper Pass +	21A6A	5400	1/30	227	81.5	56.0	59.3	--
Marten Lake +	21A9A	3600	1/30	170	65.5	57.4	60.0	--
Mount Blum +	21A18a	5800	1/30	168	58.8	55.3	60.0	--
#Panorama	21A5	4300	1/12	134	47.4	53.9	45.8	--
			1/27	185	69.6	51.5	53.8	--
Rocky Creek	21A12A	2100	1/30	58	23.2	22.4	28.0	--
Schreibers Meadow +	21A10A	3400	1/30	120	46.4	36.8	41.8	--
S. F. Thunder Creek +	21A14A	2200	1/30	6	2.4	13.3	10.1	--
Watson Lakes +	21A8A	4500	1/30	124	46.3	49.0	46.7	--

Not directly on this drainage

* Adjusted 1948-62 average

+ Snow water equivalent estimated from aerial stadia observation



APPENDIX 14

DRAINAGE BASIN and SNOW COVER			SNOW COVER MEASUREMENT					
			1967		: P a s t R e c o r d			
			Date	Snow	Water	Water	Water	
			of	Depth	Content:	Content	Content	(In.)
No.	Elev.	Survey	(In.)	(In.)	:1966	1965	1948-62	Avg.
<u>NOOKSACK RIVER</u>								
Panorama	21A5	4300	1/12	134	47.4	53.9	45.8	--
			1/27	185	69.6	51.5	53.8	--
<u>OLYMPIC PENINSULA</u>								
<u>DUNGENESS RIVER</u>								
Deer Park	23B4	5200	1/27	74	19.9	18.3	14.9	18.0*
<u>MORSE CREEK</u>								
Deer Park G. S.	23B13	4850	1/27	48	11.9	14.8	14.1	--
Morse Creek	23B12	5425	1/30	135	31.2	32.6	29.5	--
<u>ELWHA RIVER</u>								
Hurricane	23B3	4500	1/30	72	22.1	17.0	18.9	--
<u>SKOKOMISH RIVER</u>								
Black & White	23B7	4200	1/5	68	16.8	--	--	--
			1/30	101	35.2	33.5	32.8	--
Black & White Lakes	23B6	4700	1/5	94	28.9	--	--	--
			1/30	135	54.1	45.9	38.5	40.0*
Four Streams	23B10	3000	1/5	40	9.8	--	--	--
			1/30	65	24.9	24.4	26.4	--
Home Sweet Home	23B5	5200	1/5	126	40.2	--	--	--
			1/30	176	65.2	52.7	47.8	--
Sundown Pass	23B8	3900	1/30	118	48.0	44.1	42.4	--

* Adjusted 1948-62 average



Agencies Assisting with Snow Surveys

GOVERNMENT AGENCIES

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Department of Lands, Forests and Water Resources,
Water Resources Service, British Columbia

States:

Washington State Department of Conservation
Washington State Department of Natural Resources

Federal:

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Corps of Engineers
U. S. Department of Agriculture
Forest Service
U. S. Department of Commerce
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Okanogan Irrigation District
Wenatchee Heights Irrigation District

MUNICIPALITIES

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City of Tacoma
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Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.

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